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Genealogy of nature conservation: a political perspective

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Abstract

Modern nature conservation is a product of post-Enlightenment modernity; I explore the heterogeneity of its conceptual and ideological background. The 19th century legacy comprises concern over human-caused extinctions; protests against excessive hunting and cruelty toward animals; utilitarian care for natural resources; and romantic sensibility concerning the value of nature for human health and spirituality. The 20th century added into conservation thinking increasing consciousness about human biospheric dependence; efforts to identify appropriate conservation targets; and most recently concern over the loss of biodiversity. The politics of nature conservation has taken shape within the framework of politics of nature, that is, choices vis-á-vis nature that have been made either as deliberate decisions on resource use or as side-effects of subsistence practices of various types. Because of tensions and conflicts with alternative ways of using nature, formulating realistic conservation policies has been a complicated task. Problems and uncertainties emerge: pursuing material aspirations of the current world society will necessarily bring about damage to ecological systems of the Earth. The way forward is to identify feasible alternatives in the midst of the tensions and ambiguities that arise, and to open up space for carrying through conservation initiatives.

Keywords

conservation thought, conservation policy, conservation governance, utilitarian conservation, romanticism, genealogy, framing, normativity, normative order, action space

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Introduction

The political in nature conservation

Conservation of nature became established as a duty of national governments in the course of the 20th century. Every country went through particular idiosyncratic stages, but the process was essentially international, driven since the first half of the 19th century by a strengthening public opinion and, eventually, citizen movements. Good national histories are available, variably sensitive to the international background scene; I'll mainly restrict the discussion below to Britain (Evans 1992; Adams 1996) and the US (Hays 1969; Keiter 2003; Andrews 2006), backed with my own Finnish experience.

As a research speciality, nature conservation was stabilized quite recently, basically with the origin of the new biological sub-discipline of conservation biology in the 1980s: *The Society for Conservation Biology* and its journal *Conservation Biology* were established in 1986. The self-image of the research field was summarized in the 20th anniversary issue of the journal, published in June 2006 (Meine et al. 2006). It is woven around a narrative of a growing concern about deterioration of nature under human encroachment which triggered concerned biologists to establish a new "crisis discipline," in Michael Soulé's often quoted phrase (Soulé 1985).

However, this brief narrative scratches only the surface. The current ethos of nature conservation is a product of post-Enlightenment modernity. An early springboard for what later grew into the current conservation ethos was strengthening doubt against Enlightenment trust in historical progress which was backed by a religious conviction that the design of the Earth was inherently favourable for human well-being. Clarence Glacken (1967, 549) assessed the scepticism about progress as follows: "When the protective cover of design is removed, lesser ideas escape and assert themselves like children rebelling from their parents. The idea of progress has similarly concealed supposedly minor failures in the millennial march of civilization. Remove it, and these failures stand on their own feet."

The path from early post-Enlightenment scepticism to modern nature conservation has been long and winding. My aim in this essay is to trace stages through which nature conservation has become a broadly accepted but also contentious field of public policy. The main argument of the essay comprises two parts. The first part presents an outline of the genealogy of conservation thought: how nature has got normative weight in modern societies and what kind of specific knowledge has supported this development. I summarize my perspective on genealogy in the next section, and describe the genealogy in the subsequent section. The second part, in the last two sections of the paper, presents key aspects of the political challenges brought about by nature conservation. I use 'framing' and 'reframing' as a methodological perspective to specify goals and background assumptions of various stages of conservation thought. Several essays in Hajer and Wagenaar (2003) describe the methodological approach.

I use the term *politics of nature* to describe the general background of choices that are made vis-á-vis nature, either deliberately or as side-effects of activities that build up

human subsistence. This perspective is largely congruous with the term 'politics of nature' as used by Bruno Latour (2004). First decisions pertinent to politics of nature were made at the dawn of human cultures, such as, for instance, choosing favourable sites for houses and villages, marking their surroundings with human symbolism and paraphernalia, and claiming space for hunting, gathering and cultivating. Later on the scope of politics of nature has expanded in parallel with the growth and diversification of human economic activity. Politics of nature gives shape to the political and societal conditions under which nature conservation either gets, or does not get political leverage.

Politics of nature cuts both ways: humans modifying nature mould themselves, by their very actions. Various elements and processes of nature are active participants in this interplay. Awareness of such interdependence is ancient and has formed one of the springboards of modern nature conservation. Understanding of what nature is has, of course, been modified over the centuries, but politics of nature is primarily about concrete decisions on resource use, modification of the surroundings, and so on, in increasingly complicated economic, social and political contexts. Modern nature conservation is one alternative among many others in making decisions concerning nature. The whole scene is thoroughly permeated by uncertainties, doubts and vested interests.

However, I have to add one important caveat: The perspective in what follows is seriously biased toward the industrialized world. While the developing countries have a critical position on the current scene of politics of nature and nature conservation, I mainly have to leave them out, for lack of space and expertise. One of the reasons is the huge variation there is in both natural and political conditions across the developing world. Brief generalizations would be caricatures of no analytic value; for the theme, see Western et al. (1994), and Adams and Mulligan (2003).

As human historical experience of use of nature can be made meaningful within mutually contradictory interpretative frames, ambivalence is an unavoidable companion in politics of nature. My view is that such ambivalence can play a productive role in conservation thought. Nature conservation is about choices in relation to nature, and the inherent ambiguity of criteria forces us to assess what is important in any particular situation. Identifying critical ambiguities opens up space for constantly rethinking the framing of conservation policy. Every apparently simple decision has complex trade-offs and unanticipated consequences. Puristic fundamentalism paves the way for disasters.

On genealogy

People have, of course, always known that their sustenance depends on something that is outside of their powers, that is, nature. Accordingly, the view that humans are not entitled to deal with the rest of nature any way they wish is ancient. Nature sets rules on proper human behaviour, and people have tried to figure out what those rules are.

This reasonable position is less conclusive than it may seem, however. In material terms, the success of humanity in the intercourse with nature has been stupendous. Is the success due to following rules set by nature or, in contrast, to creating new rules?

Nature gives no answers. The human historical experience seems to support the latter alternative, but time and again, the human enterprise has suffered set-backs, often as unanticipated consequences of human actions that show up with time. Plato's lament of the disappearance of forests from the mountain sides of Attica is a famous early example.

The fact is that it is difficult to come up with unambiguous criteria as to whether a particular human-induced modification of nature is ultimately benign or destructive. We humans are denizens of the biosphere of the Earth. We have to live out of nature. Whatever we do brings about changes in the rest of nature. Decisions on what to do, choices between alternatives are always necessary.

Thus, the story of nature conservation is largely a story of how nature has won a place in the normative order of modern societies. Genealogy aims at analyzing the historical constitution of normative orders; a paradigmatic model is Friedrich Nietzsche's *The Genealogy of Morals*. Accordingly, a genealogical perspective toward any particular idea sheds light on how the idea came to be, and what kind of background made it seem like deserving serious attention and, perhaps, acceptance. Philosopher Ian Hacking (2002) uses an alternative expression, 'historical ontology.' It brings into focus beliefs people have had in the past about what reality is like. A pertinent question is what kind of observations and experience was accepted as evidence supporting particular beliefs. This question obviously concerns scientific assumptions and theories as well as more mundane popular beliefs (Chandler et al. 1995).

As a normatively grounded perception of human place in the natural world, nature conservation has straightforward implications as to what is right and what is wrong in the economic and social practices of a given society. Hence, it lines up with the normative order of the society. Sociologist Barry Barnes (1988) analyses the nature of normative order in society in a useful way. First of all, a normative order is a collective phenomenon that has taken shape through experience-backed common agreement among members of a society: "The normative order must arise from calculative conformity and the calculative sanctioning of others into conformity." As a product of history, a normative order is analogous to "second nature" as a human-created world which is facing the present generation as a set of external constraints (see Dyke 1988 on convention as second nature).

As Barnes further notes, knowledge has a special role at the basis of normative order. Knowledge shared among members of a particular society supports the acceptance of social facts such as division of labour and differentiation of social classes. Barnes emphasizes the self-referentiality of social knowledge. When a large enough number of people in a given society share a belief, the belief is accepted without further questioning. Barnes (1983) calls this a "boot-strapping" view of social knowledge.

Knowledge of nature is less pliable than knowledge of society. Obviously, "boot-strapping" cannot make nature to fold into whatever shape people want to get it. However, when nature is allocated a role in supporting societal norms, the difference gets diluted: factual knowledge of nature is at a distance from the norms it is supposed to support. This relationship resonates with ambiguities inherent in nature conservation:

normative standards derived from nature become self-referential to the extent that any interpretation of nature can be made concordant with several alternative normative goals.

Improving knowledge of the human dependence on the rest of nature has certainly had a critical role in the stabilization of conservation thought. However, there is a need for more groundwork on identifying the bits of knowledge that have been accepted as relevant, the framing of such bits of knowledge, and the normative implications. The transformation of knowledge into evidence at any point in time in the past as well as in the present is a key term in this riddle. Evidence is Janus-faced: In a straightforward sense, evidence consists "of one thing pointing beyond itself" (Hacking 1975, 34). On the other hand, however, evidence is self-referential and speaks for itself: "evidence also carries the rhetorical sense of vividness, a gesture which refers to the immediate appeal of the fact itself." (Schaffer 1995, 57).

The vividness-dimension of evidence has been influential in nature conservation. Any exposition of the roots of modern conservation thought supports this view. For instance, David Evans (1992) opens his narrative of nature conservation in Britain with a chapter on "The why and the wherefore" and dedicates its first section to "Aesthetics." Evans cites a whole range of conservationists giving testimony to the significance of personal and aesthetic motivations for their activism in the conservation movement. According to such views, nature bears evidence all by herself, through natural harmony and beauty that are available for all humans to experience directly. Ralph Waldo Emerson's essay "Nature" is a classical expression of this view (Emerson 1965[1884]).

It is clear, nevertheless, that increasing knowledge about human place in the world has been a critical factor in the history of nature conservation. Science is a specialized form of knowledge that connects together specific factual claims and interpretative frames. Science has succeeded in this by developing its own specializations, both conceptual and practical, and giving rise to new specialist-professionals. Scientific knowledge-practices as well as the stabilization of criteria of validity within different fields of science have been essential in this development. Ian Hacking (1992) describes the dynamics of stabilization as a 'self-vindicating structure' that is created by the practical work of scientists themselves.

Stabilization of a knowledge base is necessary for any branch of research. The knowledge base of conservation thought is created primarily by ecology and its sister disciplines. The practices ecologists have been involved with are critical as establishing and supporting evidence held decisive. Hacking applied the notion of 'self-vindicating structure' to laboratory sciences, but a similar process has stabilized also ecological field research (Haila 1992, 1998). Specifying the conditions of stabilization is one of the challenges of genealogical analysis: In Chuck Dyke's apt term, stabilization depends on "the progress in investigative practice" (Dyke 1988, 138). As Dyke also emphasizes, the progress of investigative practice is not linearly accumulative. This is certainly important in conservation science tied to normative views which change through a different dynamics than the research itself (Haila 2004), but I have to leave this aspect to a few short remarks in this essay.

An ethical conviction can, of course, be more compelling than the knowledge it is backed with. A passionate concern for everything alive, at the extreme an Albert Schweizer type respect of life, is one manifestation in the sphere of conservation thought. Although the decline of trust in a Divine providence was an early springboard of conservation thought, religious convictions have not vanished. The forcefulness of moral visions underlines the fact that the acceptance of conservation norms moulds human subjectivities.

In the following I chart main layers of the genealogy of modern nature conservation. As is the case with the genealogy of all traditions of any complexity, such layers cannot be ordered into a chronology. Instead, modern conservation thought has grown from several different sources which have partially separable and partially convergent histories. My interest is mainly to explore how conservation thought has slowly become explicitly political, in the sense of aiming at changes in the politics of nature of modern societies. The narrative layers form a background for the last two sections of the paper, focused on conservation governance.

Modern conservation thought: from moral awakening to systematic knowledge claims

Human-caused extinction

Extinction of species is the apotheosis of irreplaceable change in nature that humans are capable of bringing about. William Adams names "the stand against extinction" as the common concern in the 20th century conservation thinking (2004, 17). Originally, the question was whether extinctions have happened in the history of life at all. The historical fact of extinction arose from palaeontology in the 18th century; this triggered religion-driven controversies about the mutability of the natural order, lasting well into the 19th century (Mayr 1982, 347-349). Darwin's theory of evolution finally settled the issue; in *The Origin*, Darwin dedicated a 4-page section to "On Extinction." The fact of extinction had to break through a metaphysically grounded dogmatic view of the world.

Human culpability in species extinction was finally accepted in the late-19th century, by and large (Adams 2004). Decisive evidence seems to have grown from the practical experience of the "community" of big game hunters in European colonies. Adams (2004, 30) makes the point in a forceful wording: "There is no doubt that the driving force for wildlife conservation at the start of the 20th century in both Africa and India were the European hunters." As luminous members of high societies of the affluent world, colonial hunters were in the position to launch international meetings and organizations supporting the cause of nature conservation. One of the results was the establishment of the *Society for the Preservation of the Wild Fauna of the Empire* (1903). The society dropped 'wild' from its name in 1919; it became *Fauna Preservation Society* in 1950 (Adams 2004). British hunters got whole-hearted support from prominent

Americans such as Theodore Roosevelt. Later on, the fact of human-caused extinction was brought into public attention by symbolically important cases such as the passenger pigeon (*Ectopistes migratorius*), the great auk (*Pinguinus impennis*), the quagga (*Equus quagga quagga*), the dodo (*Raphus cucullatus*), and so on. Natural history stories of these and other cases are documented in a great number of works.

However, as always, the view that human modification of nature may drive other species to extinction had precursors. Clarence Glacken (1967, 678) regards Count Buffon as an important figure. Although an Enlightenment man and a firm believer in human progress, Buffon was aware of negative changes that humans may bring about in the surrounding nature.

Romantic sensibility

Although romanticism had its origin within Enlightenment rationalism and, thus, shared the same basic assumptions, it brought new elements into a general understanding of the humanity-nature relationships. The famous phrase that German romanticists discovered the Alps has some truth in it, although they had a long row of precursors, extending back at least to Petrarch and his climb to Mount Ventoux on April 26, 1336. Nature was not only to be exploited; nature was also to be adored.

Perhaps the most important legacy of romanticists is their view that nature has a special role in the spiritual improvement of humanity. Major literary figures supported the romantic vision and gave voice to adoration of nature with a distinctly modern tone. William Wordsworth was an important inspiration in England; his *Guide to the Lakes* (1810) includes one of the earliest suggestions on the need to protect natural areas as "a sort of national property, in which every man has a right and an interest who has an eye to perceive and a heart to enjoy" (cited in Holdgate 1999, 4). Geographer and explorer Alexander von Humboldt had a similar inspirational role in German speaking continental Europe around the same time. Also Humboldt used the attribute 'national' in his vocabulary. In northern Europe, a prominent promulgator of the cause of nature conservation was Finnish born explorer Adolf Erik Nordenskiöld.

Romantic adoration of untouched nature had a great influence in North America, mediated by East Coast transcendentalists. Famous personalities, such as Ralph Waldo Emerson, Henry David Thoreau and John Muir were moulded by this movement (Nash 1967 tells this story). They all had visions, but John Muir was an organizer under whose influence for instance the Sierra Club, one of the most influential conservation organizations in the US, was founded in 1892.

Connotations of the term 'national' are ambivalent in that they include both nationalism and public good. In political terms, the former is exclusive as supporting the consolidation of a particular Nation whereas the latter is inclusive, as advancing the moral education of all citizens. In the views of romantic visionaries such as John Muir the latter aspect was dominant through a Pantheistic belief in the healing powers of nature, available similarly to all humans. But also a more exclusive convergence of

nature and nationalism took shape in semi-institutional forms. Particularly in northern Europe, nature was constructed as an important part of the symbolic cultural self-image of the gradually consolidating nation states. It seems there are differences across nations in this regard: younger states, with less of a unified cultural heritage, were more inclined to adopt "original nature" as their emblem than older and more firmly established ones. Germany and France differ in this regard, as do the Nordic countries among one another. Norway (independent since 1905) and Finland (independent since 1917) cherish strong national images of nature: fjords and mountains in the former, forests and lakes in the latter. The old Nordic powers Sweden and Denmark lack unifying "national natures" in a similar sense. What they have as national ideal natures, such as the Danish heath and the Swedish archipelago, bear marks of middle-class identity-construction and class distinction.

Utilitarian conservation

Enlightenment rationalists trusted human capacity to bring about favourable changes in the surrounding nature. Historically, such optimism was supported by the systematic harnessing of natural resources of the developing nation states to support domestic economies. Successful draining of wetlands and management of waterways gave ample support for such optimism. Paradigmatic examples include the Dutch Golden Age (Schama 1988) and the program of "inner colonization" of wetlands along the rivers in northern Germany, launched by Frederick the Great in the 1740s, and the taming of the Rhine a little later (Blackbourn 2006). Inner colonization got boost from the state-centered economic doctrine of Cameralism.

Active human modification of natural elements of the environment was broadly accepted among romanticists as well. Rationalistic functionality and romantic spiritual improvement join hands in the moulding of urban gardens and parks (Rykwert 1980). The colonial experience was Janus -faced in an analogous fashion. On the one hand, as historian Alfred Crosby (1986) has shown, successful colonization on a large scale produced "Neo-Europas" in those parts of the other continents where natural conditions resembled those from which the colonists came. Crosby dubbed the ensuing environmental modifications "ecological imperialism." But the colonial experience produced another reaction, too. In local contexts, colonists were left on their own in environments that were alien to them, and started to familiarize themselves with the conditions in which they eked their living. This experience produced "moral ecologies" that included an incipient need to respect the ecological conditions the European colonists were subjected to. Evidence for such a change comes from different parts of the colonized world: New England (Judd 1997), New Zealand (Wynn 2004), and tropical islands as well as the Cape district in southern Africa (Grove 1997). George Perkins Marsh who published his masterful exposition of humans as geological agents on the Earth, *Man and Nature*, in 1864 was a product of the New England conservationist tradition (Judd 2004).

Critical questions were asked concerning the feasibility of progress also within the European heartlands. Glacken (1967, 485) takes up John Evelyn's *Silva* (1664) and Colbert's *French Forest Ordinance* (1669) as emblematic works that "mark … the beginning of a more reserved attitude towards the modification of nature by man in the history of Western thought."

In other words, despite successes, human-initiated modifications of nature brought into the open a new type of ambivalence: Where does the human ability to improve nature come from, and What are its limits? Although dreams of industrial progress reigned supreme in the 19th century, overt optimism was accompanied by doubt and criticism. Malthus, of course, is a well-known critic of optimism about human progress in the early decades of the 19th century; somewhat anachronistically, he might be regarded as a utilitarian conservationist.

Conservation ideology adopted in the US in the era of Progressivism at the turn to the 20th century was an outgrowth of utilitarian conservation (Hays 1969, Andrews 2006). The approach implied a search for correct rules for human use of nature's resources. Practical traditions in agriculture, range management, forestry and fisheries have produced background knowledge for modern ecology (Haila 2011). The debate in the US produced a conflict between two competing attitudes, 'preservation' and 'conservation', the former drawing upon visionary views of human coexistence with nature (as supported by John Muir), the latter upon wise use of natural resources (as supported by Gifford Pinchot, the first head of the US forest service and a close advisor to Theodore Roosevelt, as well as by Roosevelt himself, to the dismay of Muir). Scientific concepts were adopted to support the conservationist view. The notion of "sustainable yield" was formalized in fisheries and forestry; the term originated in the context of German forestry science in the late 18th century. Later during the 20th century the norm of sustainability was uncoupled from yield and reframed in terms of viable ecosystems.

"Nature is our friend"

The mixing together of utilitarian and romantic views of nature found positive resonance in public opinion in the course of the 19th century. Public protests grew against excessive hunting and cruelty toward animals among the public at large, marking the birth of new attitudes and subjectivities vis-à-vis nature. There is lots of literature on this process. The high social respect enjoyed by naturalism in Victorian Britain is well-known. Evans (1992, 34) names *The Temple Coffee House Botanic Club* (established in 1689) as an early precursor. The club specialized in the use of plants in medicines. The success of Gilbert White's *Natural History of Selborne* (1788) gives testimony for the popularity of naturalism in England, but the phenomenon was wide-spread also elsewhere in Europe (Drouin and Bensaude-Vincent 1996).

Birds gained a special position in this movement: protests against the collection of feathers for use in female fashion, for instance, grew up both in the English speaking

world and in continental Europe. Indignation about excessive hunting of birds during migration and at winter quarters gave further fuel to the spread of associations and public protests. Also the usefulness of songbirds in pest control was noted. In Finland, quite typically, a well-known historian and popular author Zacharias Topelius participated in the founding of a bird protection society called *Majföreningen* in 1870 ("May Association" in English; Swedish was at that time the main language of the learned echelons of the Finnish society; Vuorisalo et al. 1999).

The shift was a reflection of changing social identities, class positions and prevailing mores. My hunch is that the new moral sensibility developed in parallel with how the rising urban middle-class self-organized itself in the 19th century (Dyke 1999). As Chuck Dyke points out, the urban middle-class developed a passionate interest in cultural heritage and pre-modern architecture as epitomized, for instance, in the figure of John Ruskin. But no doubt, the shift in public opinion got support from the organizational efforts toward nature conservation initiated by colonial hunters.

Changes in public mores brought about changes in legislation. Bounties were scrapped, and lists of protected species were included in conservation laws. Conservationists made pleas for turning the logic around so that the laws would only include what they called "black lists", i.e., species that lack protection. Eventually such a change took place, but this had to wait until well into the 20th century.

Human biospheric dependence

In current thinking, the need to protect nature cannot be disentangled from a perception that the existence of human societies depends on the 'life-support system' of the Earth, to use Eugen P. Odum's (1989) phrase. This convergence is relatively recent, however. The idea of human biospheric dependence grew out of 19th century science, specifically the view of the Earth as a unified energetic and biogeochemical system. The biosphere is driven by energy carried by solar radiation and assimilated into biological processes by photosynthesis (see Smil 2002, Lenton and Watson 2010 for recent overviews). In terms of materials, the Earth is basically a closed system; hence, for life to have thrived on the Earth for almost four billion years, the materials necessary for metabolic processes have to be constantly recycled. Russian geochemist V.I. Vernadsky was a pioneer of biogeochemistry as well as a promoter of the term 'biosphere'; but as always, there were precursors (Smil 2002; on biogeochemistry: Wilkinson 2006; Lenton and Watson 2010).

Ecosystems ecology represented by, for instance, brothers Howard and Eugen Odum, grew eventually out of the soil prepared by Vernadsky. Biophysicist Alfred Lotka was a critical mediator. Lotka's overview *Elements of Physical Biology* (1924) provided a synthesis of the dynamics of ecological populations and ecological communities (the term 'ecosystem' was adopted in the 1930s). A remarkable feature in Lotka's work is his insightful analysis of the nature of human dependence on what he called "the world engine," formed as the sum total of local ecological energy transformers.

Brothers Odum, particularly Howard T. Odum, made heroic efforts to use energy as a unifying term in ecology and humanity-nature interactions. This effort turned out as a failure, as energetic interactions in ecology are qualitatively specified to a much higher degree than the Odum models implied (Fox 1988; Dyke 1997, Smil 2008). However, their groping produced important background material for ecological economics on the one hand, and biospheric systems science on the other hand.

To summarize, although the biospheric perspective originated in the late 19th century at a considerable distance from contemporaneous conservation issues such as concern over species extinctions and protests against excessive hunting, it brought eventually new and important arguments into the support of the conservation cause.

Identifying conservation targets

Nature conservation requires specification as to what has to be preserved and for what particular purpose. Views concerning proper conservation targets grew from several sources and stabilized only gradually. Originally, the targets were broad-scaled natural landscapes considered symbolically and spiritually invaluable such as the English Lake District praised by Wordsworth. Landscape values were a dominant argument in German protests against dam-building in the 19th century, and this ethos carried along well into the 20th century. In the 1930s, conservationist Arno Naumann described activists like himself as "guardians of aesthetic landscape values" (Blackbourn 2006, 224). A similar ethos on the primacy of large-scale conservation targets spread to North America with the romantic movement.

It is probable that the first measures toward nature protection were triggered by peculiar, historically shaped reasons in different countries. "Natural monuments" (*Naturdenkmäler*) were a high priority in Germany, whereas the preservation and management rules of public lands dominated in North America. Such a difference is well understandable: intensely culturally marked landscapes in the one, and perceived vast wilderness in the other. Probably the relative weight of nationalistic ideology versus promotion of public good varied across countries, but this aspect would require a separate analysis.

Legislation on national parks started to take shape variably in different countries but generally quite late. In Britain, for instance, an important year was 1938 with the publication of a founding document, *The Case for National Parks in Great Britain*, and a corresponding bill was drafted in the following year (Evans 1992, 62-3). An administrative body, *The Nature Conservancy* was established in 1948. No doubt, the delay with granting a legal status to national parks was due to opposition from the side of land-owners and agriculture and forestry communities, in quite parallel forms across the industrialized world.

Establishing a network of targeted preserves dubbed *Sites of Specific Scientific Interest* (SSSIs) was an innovation of English ecologists who promoted nature conservation in the 1930s. The network got an established legal status in 1948. In the early 1990s,

SSSIs numbered 6700 (Evans 1992). Originally the selection of the sites was based on ecological criteria, but geological formations were also included later on. However, the legal protection of the sites was weak, and valuable sites were lost from the network (Evans 1992, Adams 1996).

The task attributed to authorities by conservation legislation was to develop new instruments for nature conservation, in addition to managing existing preserves. It was not sufficient to argue for the uniqueness of specific sites or species, as was the case in the first half of the 20th century (Adams 1996 is a good analysis of the case of Britain). Typically, common natural types were not covered by the first inventories of areas requiring protection. For instance in Finland, typical taiga forests were included in the national park network only in the 1990s. To improve the systematic character of protection measures, conservation authorities started to compile lists based on general criteria.

The initiative to compile lists of endangered species came from NGOs (WWF in particular): Red Data Lists acquired a systematic form in the 1960s. The first organisms covered were vertebrates (birds, mammals, fishes, reptiles and amphibians) and vascular plants in single countries. Then, since something like the early 1990s, the lists have become international and cover increasingly also invertebrates and other less well-known taxa. Mace (1995) tells the story.

A crucial event in the stabilization of nature conservation across Europe was the European Conservation Year of 1970, celebrated on the initiative of the Council of Europe. In a relative late-comer such as Finland, the influence of the year was decisive: the first national-level planning body, a governmental committee, was established to organize events of the year as well as to plan future measures. By then, the only authority in charge of nature conservation on the national level comprised a three-person staff sitting in a tiny little office located in the Forest Research Institute. Sweden got a well-funded Nature Conservation Authority (*Naturvårdsverket*) in the 1960s. The envious then head of the Finnish office wrote an editorial in the journal of the Finnish Nature Conservation Association with the title "A Letter to Santa Claus" in which he uttered a wish that a strong governmental authority be established also in Finland to further nature conservation.

Comprehensive conservation

Identification of conservation targets using explicit criteria gave rise to new, more systematic methods of assessing conservation values (see Usher 1986 for an overview). Assessments became ever more comprehensive in the sense of covering all species in a particularly taxon in a country, a continent, or in the whole world. I have used the term 'comprehensive conservation' for this new approach: not only the preservation of particular targets is at issue, the main concern of conservation is the viability of ecological systems and, ultimately, the biosphere (Haila et al. 2007).

'Biodiversity' was adopted as a catch-all term for this theme in the 1980s. The invention of biodiversity was a deliberate political process (Takacs 1996), and the biodiversity concern was deliberately constructed as a big, crisis-driven issue. The main

events are familiar: BioDiversity convention in Washington DC in 1985 and the publication of the material of the conference (Wilson and Peter 1988), the declaration of the UN conference in Rio in 1992, and then the adoption of national action programs of various types. The Endangered Species Act of the US (1973) was an early precursor. In the EU, comprehensive conservation is epitomized by the Habitats Directive (1992) which includes statutes both on a network of protected areas dubbed Natura 2000 and on the strict protection of specifically listed endangered species. The Habitats Directive was predated by the Birds Directive (1979) and the Berne Convention on the conservation of European wildlife and habitats (1979). On the international scene, an important step was the Ramsar Convention on wetlands (1971).

Growing scare for a human-caused extinction wave was a straightforward trigger of the biodiversity concern. The perception of extinction underwent an upheaval. Extinction is about the disappearance of single species (or populations), one by one. However, theoretical development in ecology modified extinction into a statistical concept. The trigger was the *Theory of Island Biogeography* of MacArthur and Wilson (1967) with its demonstration of a positive relationship between area and species number on islands and suggestion that this be true of patches of land of relatively uniform environmental types on mainlands as well. Turned the other way round, the relationship became evidence that a decrease in area of an environmental type inflates numbers of local extinctions. A statistical expectation was calculated from the species-area relationship (Preston 1962 made the point prior to MacArthur and Wilson). A statistical concept of extinction elevates the risk of extinction onto an abstract level: the threat of extinction is everywhere present, no matter whether it can be actually demonstrated or not.

This is problematic in several ways. The framing of human-caused extinction threat in statistical terms is based on a reification of the species-area relationship (Haila 2002, 2004). Demonstrating extinction empirically is well-nigh impossible, so, one has to resort to indicators and surrogates of various sorts (*area* remains the single most important), but using such indicators and surrogates as arguments in policy advice opens up new problems (Haila 2004). Maclaurin and Sterelny (2008) assess thoroughly the problems that arise when using surrogates for measuring biodiversity.

Important theoretical developments have taken place, of course, in conservation science which has grown exponentially since the 1980s. In this context, only a few short remarks are possible. *Landscape ecology* originated in the English-speaking world largely as a move away from the black-and-white image of islands versus unfavourable matrix, postulated by island biogeography. Landscape ecology promotes a multidimensional understanding of landscape patterns and processes; good expositions include Wiens and Moss (2005), Lindenmayer and Fisher (2006) and Lindenmayer and Hobbs (2007); for the older Central-European tradition of landscape ecology see Hard (2011). Secondly, it belongs to the logic of comprehensive conservation that the concern over biodiversity loss has joined hands with the perception of human ecological dependencies. This idea caught attention under the heading *ecosystem services* which gained currency in the 1990s, but again with precursors. *Millennium Ecosystem Assessment* has been a major effort to assess the deterioration of ecosystem services on the global level.

Toward conservation governance

A new field of public policy

In the previous section I described the main historical layers of conservation thought up to the 21st century. The political nature of conservation demands has become more articulate during the process. Modern nature conservation implies conservation governance, built upon competent administrative bodies with sufficient authority. However, it is in the nature of the field that the goal is difficult to realize; Keulartz and Leistra (2008) present good case studies of governance problems in the context of nature conservation.

First of all, nature conservation drifts regularly into conflicts with other aspirations within politics of nature. As a consequence, conflicts abound on proper framing of the goals. The controversy between John Muir's preservationist fundamentalism and the wise-use conservationism of Gifford Pinchot's US Forest Service in the early 20th century is a paradigmatic example.

Furthermore, nature conservation faces difficulties in creating workable closures as regards policy goals. A policy closure requires that the targets and the means to reach the targets can be formulated using similar concepts; this view draws upon Dyke (1988), see Haila (2008). A particular difficulty is that nature conservation aims at a moving target: when conservation succeeds, new types of problems will show up as a consequence. The protection of large predators against persecution by local farmers and hunters has given rise to conflicts all over the world. Policy closures are temporary and will be opened up by one stakeholder group or another when the situation changes.

Administrative scientists Charles Fox and Hugh Miller introduced the term *public energy field* for exploring tensions in the dynamic interplay among various actors and interests in to-day's public administration. The term 'field' in their formula refers to "the complex of forces that bear on the situation" and 'energy' "implies that the field is sufficiently charged with meaning and intention that people are aroused, alert and attentive." (Fox and Miller 1996, 9-10). Conservation policy fits these characterizations. In the rest of this section I follow the lead of Fox and Miller and list main factors and actors that have energized the field of conservation policy, in variable forms in different historical contexts.

Organized opposition

Narratives of the early stages of nature conservation take up the opposition it came across, motivated by imaginations of harms and economic losses that efficient conservation might cause. From our present vantage point, some of them seem truly ludicrous, for instance, protests against the first efforts to restrict trade on colourful feathers (Evans 1992, 48). Hunting restrictions provide similar examples. On the other

hand, some of the protests against conservation lie on more credible grounds. A well-known source of controversies has been the establishment of national parks, typically opposed by land owning classes.

Conservation controversies have become more intensive in the era of comprehensive conservation. The Habitats Directive has triggered conflicts all over Europe, both on local and national levels. Such conflicts are often understandable: comprehensive conservation intrudes in unexpected ways onto other domains of politics of nature such as local sustenance, productive practices and infrastructural development.

The specific forms of conflicts vary enormously from case to case, depending on socio-ecological particularities. Species that have got an emblematic status in different parts of Europe include the loggerhead sea turtle *Caretta caretta* (Greece), the European hamster *Cricetus cricetus* (Germany and France), and the flying squirrel *Pteromys volans* (Finland); Haila et al. (2007) analyze structural similarities between the conflicts around the turtle and the squirrel. Other famous cases include conflicts over the protection of species such as seals, the otter (*Lutra lutra*) and the great cormorant (*Phalacrocorax carbo*) which cause, either potentially or actually damages to coastal fishery and fish-farming (Varjopuro and Kettunen 2008; Rauschmayer and Behrens 2008). Sometimes, on the local scale, conservation may intervene also with culturally deeply entrenched subsistence practices. Theodossopoulos (2003) presents a culturally sensitive analysis of conflicts with local inhabitants that the protection of the loggerhead sea turtle has brought about on the island of Zakynthos, off the western coast of Greece.

Turf struggles

As a newcomer in the sphere of public policy, nature conservation has intruded into the domains of established administrative sectors responsible for the exploitation of renewable resources, such as forestry, agriculture, range-land management and fisheries. The relative weight of different sectors naturally varies across countries depending on natural conditions and economic history. Professionalism among specialists within the sectors has fuelled the conflicts. Andrews (2006) gives an example: In the US the Progressivist era brought into existence a wide range of specialized agencies in charge of resource use, but in the 1940s and 1950s they were one after the other subjected to criticism for acting on behalf of narrow and particularistic interests instead of public good. Andrews (2006, 456 [fn 27]) lists the Tennessee Valley Authority, the Army Corps of Engineers, The Bureau of Land Management, the Soil Conservation Service, and the Forest Service, and gives references to primary sources.

Infrastructure projects such as road construction and waterway management have been important sources of turf conflicts. Some development projects, for instance the construction of new harbour facilities, are by their very nature targeted to potentially valuable sites; the extension of the harbour of Rotterdam into a Natura 2000 site is a recent example. Ministries responsible for trade, industry and energy are typically in key positions.

Tensions between conservation and environmentalism

Public initiatives in nature conservation were channelled into international organizations and associations in the course of the 20th century: International Council for Bird Preservation (ICBP; established 1922) and International Union for the Conservation of Nature (IUCN; established 1948) as well as NGOs such as World Wildlife Fund (WWF; established 1961) and Friends of the Earth (established in the US in 1969) have been increasingly visible on the international scene.

The new environmentalism of the last third of the 20th century did not originally provide unconditional support for older conservation movements; Hays (1998) and Jamison (2001) are good guides. Friction has been caused by deviating views concerning proper framing of the human environmental predicament. "New" environmentalists were originally suspicious of the "old" conservationists imprisoned in their socially and politically naïve – as it seemed – traditional associations. In the era of comprehensive conservation, however, the topology of the situation has been turned upside down. The protection of nature in the guise of halting the loss of biodiversity is nowadays viewed as one of the main global challenges, comparable to the prevention of climate change.

There has been oscillation between "crisis framing" and "control framing" as regards specific issues. Focused and well-defined environmental problems are amenable to a policy closure and, hence, control framing. On the other hand, crisis framing tends to dominate conservation thinking. Green parties have been major actors on the political scene of environmental concerns since the 1980s, but they have mainly had ambivalent relations with traditional conservation organizations. Green parties are vulnerable to maximalism in their goal-setting, driven by a perceived need to build up a sharp political profile.

Who are the public?

Promulgators of the cause of nature conservation have included from early on both special interests such as big game hunters and the public opinion at large. The role of the public, in the shape of actual movements, has varied and fluctuated in intensity. The constellation of the movement has varied as well, but some aspects are obvious. First of all, the environmental awakening of the 1960s-1970s brought about a confluence of an exceptionally broad range of movements and interests from different sectors of the civil society. As a demonstration, Andrews (2006, 225) gives an impressive list of organizations and groups that participated in the first Earth Day in the US on April 22, 1970. But such a broad constellation was a once-only phenomenon. Second, nature conservation has been propped up among the public at large by emblematic species such as whales and seals. Third, conservation associations and international NGOs have become increasingly professional, particularly in the context of international negotiations (Jamison 2001; Chatterjee and Finger 1994 report on lobbying at the Rio Conference, 1992).

Accusations thrown at conservationists about urbanized elitism abound, but the situation is far from one-dimensional. For instance, movements that defend old-growth forests in northern Finland have been supported by Sami reindeer herders: lichen growing in old forests is the main forage of their animals in the winter. Similar examples abound from all parts of the world. In other instances local populations have turned into supporting nature conservation demands for other kinds of reasons ranging from game management, gathering berries and mushrooms, and recreation. Local municipal politicians have commonly turned their stakes and started to support the establishment of national parks; this transition took place in Finland in the 1990s.

On the other hand, the era of comprehensive conservation has brought forth new challenges for the legitimacy of nature conservation among the public at large. Top-down initiatives, particularly the establishment of Natura 2000 protected areas have given rise to popular opposition in many member countries of the EU (examples in Keulartz and Leistra 2008). Engelen et al. (2008) note that the nature of legitimacy of conservation has changed, from substantive to procedural. Procedures of drawing up and implementing conservation plans matter more than before, and public participation is increasingly held necessary.

Prospects: stabilization and ambivalence

Politics easy, policy difficult

Nature conservation is politicized on the ground, as the example of EU Habitats Directive shows. Problems arise because decisions regarded as technical on an upper administrative level have unexpected distributional consequences on the ground (Engelen et al. 2008). An analogous pattern is apparent on the global scale as well: it is possible these days to come to agreement about ambitious general declarations on biodiversity preservation, but efficient policy is an entirely different matter. The previous goal of halting the decline by 2010, and the new goal-setting agreed upon in Nagoya in 2011 as well as the 2020 program of the EU, published in 2011, serve as examples. The problem is that it is difficult to specify policies that could possibly halt the deterioration of biodiversity. There simply is no straightforward way of halting the expansion of the material basis of the current world society.

As a reflection of this state of affairs, gloomy assessments abound. A typical example is provided by the 20th anniversary issue of *Conservation Biology*: "(I)t is clear that although we may be winning a few battles, we are still loosing the war. With perhaps 20 years or so left to turn the tide, it is worth asking why." (Balmford and Cowling 2006).

In these terms, the task appears daunting. However, the dilemma can be opened up from a different angle; I follow political scientist Giandomenico Majone (1989). First of all, the rhetoric of battles and war has to go. Instead, a closer look is needed at the nature of the problems. Current conservation goals are built upon scientific arguments, but problems met in implementation touch upon political conflicts that cannot

be solved by science alone. Majone refers to the concept of 'trans-scientific issues' of Alvin Weinberg (1972), that is, "questions of fact that can be stated in the language of science but are, in principle or in practice, unanswerable by science." (Majone 1989, 3). Silvio Funtowicz and Jerome Ravetz have carried further this line of thinking with their notion of 'post-normal science' (Funtowicz and Ravetz 1990), but there is no space to go deeper into their approach.

Feasibility analysis is the first step recommended by Majone. "(I)t is often more fruitful to ask what cannot be done and why, rather than what can be done" (p. 71). Feasibility analysis involves charting the constraints and impossibilities that restrict the space of action in a given field. It is not difficult to identify constraints faced by nature conservation: the long temporal horizon required for achieving changes in infrastructure and people's ways of life; sustenance necessities of local populations; conflicts with other fields of politics of nature; and so on.

The next step is to scrutinize the constraints to widen the action space of conservationists. Majone supports what he calls "the theorem of the second-best" (Majone 1989, 77): "(I)f suboptimal or second-best solutions are the only feasible ones, then it follows that feasibility, rather than optimality, should be the main concern of policy analysts, and that they should be as occupied with political and institutional constraints as with technical and economic limitations." The implementation of second-best solutions opens up a new round of exploring constraints and finding ways to modify them (p. 87): "The iterative process of discovering constraints and modifying goals or strategies accordingly is the essence of policy implementation."

As Majone emphasizes, developing good arguments and testing the arguments through practical experience is a precondition of any progress. Setting goals and constructing instruments for reaching the goals is a dialectic process; and the realism of the goals is essential from the processual point of view. I leave the last word in this context to Majone (1989, 69): "To try to do something that is inherently impossible is, to borrow from Oakshott, always a corrupting exercise."

Normative background versus evidence

The significance of economic and socio-cultural constraints in nature conservation brings into the open a major ambivalence concerning science: Science aims at analytic generalizations but actual conservation problems are contextual and change shape when situations change. This dilemma is at the background of the strained relationship of ecologists to environmental problems. Early on, ecologists were commonly enthusiastic about the ability of their science to address environmental problems, but they got disillusioned. Eugene P. Odum's widely read 1950s textbook *Fundamentals of Ecology* was a good demonstration of the optimism. McIntosh (1985) comments upon the disillusionment in his US-centred history of modern ecology; Boucher (1998) presents a personal narrative.

The relationship is strained at present, too. Kinchy and Kleinman (2003) conducted interviews with 18 prominent members of the Ecological Society of America and

concluded that ecologists tend to maintain a boundary between science and politics because of a perceived necessity to guard the independence of their science.

The dilemma is made more serious by the all-encompassing nature of the concepts of biodiversity and ecosystem services. Biodiversity is a concept very few people can comprehend; also biologists are confused, as testified by the interviews conducted by David Takacs (1996). One of the main promulgators of the concept, Edward O. Wilson has remarked that "biodiversity is, in a sense, everything." (Wilson 1997, 1). This is a singularly unhelpful remark: how do you protect "everything" to begin with.

My view has been for some time that all-encompassing goal setting in nature conservation is counterproductive. There is no closure, and no reliable metrics. The ideal turns upon itself, as it were. If reliable reference points in external reality are missing, conservation thinking becomes self-referential.

Of course we humans need to care for nature on her own terms, and of course we need standards. However, it is not "pristine" or "untouched" nature that we can resort to for deriving standards. We have to focus on nature on which our existence on the Earth depends: the second nature that we have modified to be as benign to us as ever possible. Our only reasonable hope is in creating a mutualistic relationship between ourselves and the rest of nature. Mutualism is interdependence: the nature we depend on depends on our care and stewardship (Haila 2009). In general terms, we might promote 'harmony' as a normative standard (Haila and Dyke 2006), but what harmony means in specific situations requires close scrutiny. It is precisely at this point that moralistic purism turns harmful.

Being hooked on all-encompassing conservation norms creates another misperception: everything that people do starts to look as a threat to the rest of nature. Instead, we need a more precise imagery of such factors that bring about biodiversity loss. An ultimate paradox of biodiversity is that strictly speaking, there is no need to know it. What we need to understand is, what processes in nature support the functionality and diversity of living systems. And more importantly: Which of our actions are most harmful, and which are benign?

The standards we adopt need to be congruent with knowledge of how nature changes. In nature conservation this could be achieved by adopting a dynamic perspective; I have previously used the label *dynamic conservation* for efforts to get human-induced change in the environment to parallel with natural dynamics that take place without human influence (Haila et al. 2007, Haila 2007). Rauschmayer and Behrens (2008) characterize such a perspective as a shift from species protection to species management.

Framing, reframing, and reframing!

Richard Andrews (2006) opens his history of American environmental policy with the sentence: "Every society develops particular patterns of relationships between its members and their natural environment." This, no doubt, is a historical fact and close

to what I have called politics of nature. One could further argue that any society that approaches the limits of its own subsistence base has had to develop methods of taking care of critical aspects of the environment, one way or another. This arguably is a historical fact, too, although, of course, expansion and plunder have been prevalent ways of dealing with local environmental shortages in the past; Barbier (2011) is a good guide to this unpleasant and abhorrent legacy.

There are no ready-made answers as to how critical elements and processes in the environment should and could be protected. The task has to be viewed within a proper framing in each case separately. Large-scale tensions about politics of nature are constantly constraining the range of available alternatives. The constraints are serious, to say the least. It is largely an open question whether a sustainable future is feasible at all, when considering the projection of human population size and the necessity to improve the lot of the poor. There are no magic bullets for matching conservation goals with such Protean tasks.

Perhaps a wise rule in the sphere of politics would be: Instead of composing overambitious declarations, identify real crimes and do something to prevent them. Contextual specifications help. We are well aware of practices in forestry, agriculture, fisheries and so forth that bring about threats of immediate eco-social collapse: Why not address them, to begin with?

A major task is framing and reframing conservation issues in such a way that conservation policy be brought into a positive resonance with other human endeavours – and thus open up chances to change those endeavours. In this sense, the visionary goals formulated by the romantic movement from European path-breakers to North American transcendentalists are continuously valuable, no matter how utopian they perhaps seem. The "wild" in Thoreau is my personal favourite (see Bennett 1994, Haila 1997).

From this perspective, the symbolic weight of conservation issues is good news. The possibility of companionship in local contexts is an interesting perspective: a rare species or a specific natural area can become a matter of pride for a particular local community. But for this to happen, people need to get into touch with those creatures and areas. The closer to habitation a protected natural area is, the fewer "no trespassing" signs there ought to be.

The big picture

The social praxis of nature conservation is heterogeneous – in agreement, in fact, with the heterogeneity of the historical heritage. Several conclusions follow from this fact.

First of all, a vision of nature conservation as a "pure-bred" activity is misplaced. Nature conservation has to open up space for itself within the framework of politics of nature. This cannot happen through an oppositional stance toward everything else. Conservationists have to get involved with economic and socio-cultural endeavours mingled together with nature conservation in conflicts and struggles over politics of nature.

Let's be honest about the ecological predicament of the current world society: It is simply impossible that damage to ecological systems of the Earth could be completely avoided. We can only hope that the damage will not turn out to be fatal for the continued existence of human societies. This situation induces serious uncertainties and dilemmas into the specification of conservation goals. One set of uncertainties pertains to inconsistencies between normative goals and research practice, as I already noted above. Another set of uncertainties arises when the significance of specific conservation losses has to be evaluated.

It is useful to draw a conceptual distinction between 'risk' and 'uncertainty': the probability of a risk can be quantitatively calculated whereas the degree of uncertainty cannot be. Maclaurin and Sterelny (2008) note that in general, the probability of specific losses can be assessed quite reliably but evaluating the consequences of specific losses is much more difficult. They suggest (p. 171) that option value be used as an evaluative perspective, as follows: "It is one thing to suppose that endangered species and rare ecosystems have option value; it is quite another to show that they will typically have sufficient option value to make them worth a major conservation effort."

I agree: It is reasonable to evaluate the worth of particular elements of biodiversity within a broad range of option values instead of resorting to strictly ecological considerations and calculations. This suggestion may seem like blurring specific concerns into an impenetrable tangle of economic, political, social and cultural controversies, but this is not the case. Rather, the perspective of option value opens up a pragmatic pathway. As political, social and cultural aspects are critical for the success of nature conservation in any case, it is best to take them into account from early on. It is then possible to specify the foci of particular goals in such a way that mutually exclusive alternatives become explicit. When specific alternatives are weighed against one another, their different implications as regards the future can be made explicit, too. Developing argumentation opens space for social and political learning.

The challenge for conservationists is to increase the action space of nature conservation, against odds that often seem insurmountable. The action space is heterogeneous. This is good news: heterogeneity makes possible that unexpected alliances take shape. Following Dyke (1993), we can explore the heterogeneity of the action space by a procedure including two steps. The first step is to identify the main dimensions of the space. I suggest, preliminarily, that these number four: [1] conservation science, [2] conservation governance, [3] civic action, and [4] conservation ethos. Quite obviously, each one of these corresponds to a semi-independent field of expertise and action.

The second step is to chart critical interactions between these specialized fields. Fruitful ambiguities are located at sites of intensive interactions. A rough criterion for identifying fruitful ambiguities is offered by the notion of contrast space (Garfinkel 1981; see Dyke 1988, 1993). A contrast space is a device for making basic background alternatives visible. I summarize this idea by taking up four key notions that imply ambiguities as regards an appropriate background:

[1] *Evidence* pertains to the credibility of scientific claims, but credibility can be assessed against alternative grounds.

[2] *Feasibility* pertains to the identification and evaluation of institutional constraints, but real and imagined constraints are blurred together.
[3] *Popular support* pertains to the degree to which the aspirations and interests of ordinary people have to be taken into account, but distinguishing real aspirations and interests from pretensions is ambiguous.
[4] *No-compromise goal-setting* pertains to such specific goals that conservationists have to stick to no matter what, but there is no sharp edge between valid knowledge claims and fundamentalist convictions.

In the worst case the kind of ambiguities listed above would be paralyzing. Paralysis is by no means necessary, however. In the course of clarifying alternative grounds for evaluation and assessment, and arguing about the respective merits of the alternatives, better arguments may win.

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References

Adams WH (1996) Future nature. A vision for conservation. Earthscan, London.
Adams WH (2004) Against extinction. The story of conservation. Earthscan, London.
Adams WH, Mulligan M (2003) Decolonizing nature. Strategies for conservation in a post-colonial era. Earthscan, London.
Andrews RNL (2006) Managing the environment, managing ourselves. A history of American environmental policy. Yale University Press, New Haven.
Balmford A, Cowing RM (2006) Fusion or failure? The future of conservation biology. Conservation Biology 20: 692–695. doi: 10.1111/j.1523-1739.2006.00434.x
Barbier EB (2011) Scarcity and Frontiers. How economics have developed through natural resource exploitation. Cambridge University Press, Cambridge.
Barnes B (1983) Social life as bootstrapped induction. Sociology 17: 524–45. doi: 10.1177/0038038583017004004
Barnes B (1988) The nature of power. Polity Press, Oxford.
Bennett J (1994) Thoreau's nature: ethics, politics, and the wild. Sage, London.
Blackbourn D (2006) The conquest of nature. Water, landscape and the making of modern Germany. Jonathan Cape, London.
Boucher DH (1998) Newtonian ecology and beyond. Science as Culture 7: 493–517. doi: 10.1080/09505439809526523

Chandler J, Davidson AI, Harootunian H (1995) Questions of evidence. Proof, practice, and persuasion across the disciplines. Chicago University Press, Chicago.

Chatterjee P, Finger M (1994) The earth brokers. Power, politics and world development. Routledge, London.

Crosby AW (1986) Ecological imperialism: The ecological expansion of Europe 1600–1900. Cambridge University Press, Cambridge.

Drouin J-M, Bensaude-Vincent B (1996) Nature for all people. In: Jardine N, Secord JA, Spary EC (Eds) Cultures of natural history. Cambridge University Press, Cambridge, 408–425.

Dyke C (1988) The evolutionary dynamics of complex systems. A study in biosocial complexity. Oxford University Press, New York.

Dyke C (1993) Extralogical excavations. Philosophy in the age of shovelry. In: Caputo J, Yount M (Eds) Foucault and the Critique of Institutions. Pennsylvania State University Press, Philadephia: 102–126.

Dyke C (1997) The heuristics of ecological interactions. Advances in Human Ecology 6: 49–74.

Dyke C (1999) Bourdieuean dynamics: the American middle-class self-constructs. In: Shusterman R (Ed) Bourdieu. A critical reader. Blackwell, New York, 192–213.

Emerson RW (1965) [1884] Essays, representative men etc., and poems, selected and arranged by GF Maine. Collins, London and Glasgow.

Engelen E, Keulartz J, Leistra G (2008) European nature conservation policy making. In: Keulartz J, Leistra G (Eds) Legitimacy in European nature conservation policy. Case studies on multilevel governance. Springer, New York, 3–21. doi: 10.1007/978-1-4020-6510-1_1

Evans D (1992) A History of nature conservation in Britain. Routledge, London. doi: 10.4324/9780203440032

Fox RF (1988) Energy and the evolution of life. WH Freeman, New York.

Fox CJ, Miller HT (1996) Postmodern public administration. Toward Discourse. Sage, Thousand Oaks, CA.

Funtowicz S, Ravetz J (1990) Uncertainty and quality in science for policy. Kluwer, Dordrecht. doi: 10.1007/978-94-009-0621-1

Garfinkel A (1981) Forms of explanation. Rethinking the questions in social theory. Yale University Press, New Haven.

Glacken C (1967) Traces on the Rhodian shore, nature and culture in Western thought from ancient times to the end of the eighteenth century. University of California Press, Berkeley and Los Angeles.

Grove RH (1997) Ecology, climate and empire. Colonialism and global environmental history, 1400–1940. The White Horse Press, Cambridge.

Hacking I (1975) The emergence of probability: A philosophical study of early ideas about probability, induction and statistical inference. Cambridge University Press, Cambridge.

Hacking I (1992) The self-vindication of the laboratory sciences. In: Pickering A (Ed) Science as practice and culture. The University of Chicago Press, Chicago, 29–64.

Hacking I (2002) Historical ontology. Harvard University Press, Cambridge, MA.

Haila Y (1992) Measuring nature – quantitative data in field biology. In: Clarke AE, Fujimura JH (Eds) The right tools for the job: At work in twentieth-century life sciences. Princeton University Press, Princeton, NJ, 233–253.

Haila Y (1997) 'Wilderness' and the multiple layers of environmental thought. Environment and History 3: 129–147. doi: 10.3197/096734097779555935

Haila Y (1998) Political undercurrents of modern ecology. Science as Culture 7: 465–491. doi: 10.1080/09505439809526522

Haila Y (2002) A conceptual genealogy of fragmentation research: from island biogeography to landscape ecology. Ecological Applications 12: 321–34.

Haila Y (2004) Making the biodiversity crisis tractable. A process perspective. In: Oksanen M, Pietarinen J (Eds) Philosophy and Biodiversity. Cambridge University Press, Cambridge, 54–82. doi: 10.1017/CBO9780511498527.003

Haila Y (2007) Enacting landscape design: from specific cases to general principles. In: Lindenmayer D, Hobbs R (Eds) Managing and designing landscapes for conservation: Moving from perspectives to principles. Blackwell, New York. doi: 10.1002/9780470692400.ch3

Haila Y (2008) Unity versus disunity of environmental governance in the Baltic Sea Region. In: Joas M, Jahn D, Kern K (Eds) Governing a common sea. Environmental politics in the Baltic Sea region. Earthscan, London, 193–212.

Haila Y (2009) The mutual interdependence of humanity and the rest of nature In: Perkiö M (Ed) Perspectives to global social development. Tampere University Press, Tampere, 165–176.

Haila Y (2011) Border zones of ecology and the applied sciences. In: Schwartz A, Jax K (Eds) Ecology revisited. Reflecting on concepts, advacing science. Springer, Dordrecht, 369–383.

Haila Y, Dyke C (2006) How nature speaks. The dynamics of the human ecological condition. Duke University Press, Durham, NC.

Haila Y, Kousis M, Jokinen A, Nygren N, Psarikidou K (2007) Building trust through public participation: Learning from conflicts over the implementation of the Habitats Directive. Participatory governance and institutional innovation (PAGANINI). 6th EU Framework Programme for Research and Technology. Work package 4, final report 2007. http://www.paganini-project.net

Hajer M, Wagenaar, H (2003) Deliberative policy analysis: understanding governance in the network society. Cambridge University Press, Cambridge.

Hard G (2011) Geography as ecology. In: Schwartz A, Jax K (Eds) Ecology revisited. Reflecting on concepts, advacing science. Springer, Dordrecht: 351–368.

Hays SP (1969) Conservation and the gospel of efficiency. Atheneum, New York.

Hays SP (1998) Explorations in environmental history. University of Pittsburgh Press, Pittsburgh, Pa.

Holdgate M (1999) The green web. A union for world conservation. Earthscan, London.

Jamison A (2001) The making of green knowledge. Environmental politics and cultural transformation. Cambridge University Press, Cambridge. doi: 10.1017/CBO9780511489143

Judd RW (1997) Common lands, common people. The origins of conservation in northern New England. Harvard University Press, Cambridge, MA.

Judd RW (2004) George Perkins Marh: The times and their man. Environment and History 10: 169–190. doi: 10.3197/0967340041159821

Keiter RB (2003) Keeping faith with nature: Ecosystems, democracy, and America's public lands. Yale University Press, New Haven.

Keulartz J, Leistra G (2008) Legitimacy in European nature conservation policy. Case studies on multilevel governance. Springer, New York.

Kinchy AJ, Kleinman DL (2003) Organizing credibility: Discursive and organizational orthodoxy on the borders of ecology and politics. Social Studies of Science 33: 869–896. doi: 10.1177/0306312703336003

Latour B (2004) Politics of nature. How to bring the science into democracy? Harvard University Press, Cambridge, MA.

Lindenmayer D, Fisher F (2006) Habitat fragmentation and landscape change. An ecological and conservation synthesis. Island Press, Washington, DC.

Lindenmayer D, Hobbs R (2007) Managing and designing landscapes for conservation. Moving from perspectives to principles. Blackwell, Malden, MA.

Lenton T, Watson A (2010) Revolutions that made the earth. Oxford University Press, Oxford.

Lotka AJ (1924) Elements of physical biology (Republished as Elements of mathematical biology). Dover, New York.

MacArthur RH, Wilson EO (1967) The theory of island biogeography. Princeton University Press, Princeton, NJ.

Mace GM (1995) Classification of threatened species and its role in conservation planning. In: Lawton JH, May RM (Eds) Extinction rates. Oxford University Press, Oxford, 197–213.

Maclaurin J, Sterelny, K (2008) What is biodiversity? Chicago University Press, Chicago.

Majone G (1989) Evidence, argument, and persuasion in the policy process. Yale University Press, New Haven.

Mayr E (1982) The growth of biological thought. Belknap Press, Cambridge, MA.

McIntosh RP (1985) The background of ecology: concept and theory. Cambridge University Press, Cambridge.

Meine C, Soulé M, Noss RF (2006) "A mission-driven discipline": the growth of conservation biology. Conservation Biology 20: 631–651.

Nash R (1967) Wilderness and the American mind. Yale University Press, New Haven.

Odum EP (1989) Ecology and our endangered life-support system. Sinauer, Sunderland, MA.

Preston FW (1962) The canonica distribution of commonness and rarity. Part I. Ecology 43: 185–215. doi: 10.2307/1933371

Preston FW (1962) The canonica distribution of commonness and rarity. Part II. Ecology 43: 410–432. doi: 10.2307/1933371

Rauschmayer F, Behrens V (2008) Legitimacy of species management. In: Keulartz J, Leistra G (Eds) Legitimacy in European nature conservation policy. Case studies on multilevel governance. Springer, New York, 55–74. doi: 10.1007/978-1-4020-6510-1_4

Rykwert J (1980) The first moderns. The architects of the eighteenth century. MIT Press, Cambridge, MA.

Schaffer S (1995) Self evidence. In: Chandler J, Davidson AI, Harootunian H (Eds) Questions of evidence. Proof, practice, and persuasion across the disciplines. Chicago University Press: 56–91.

Schama S (1988) The embarrasment of riches: an interpretation of Dutch culture in the Golde Age. Fontana Press, London.

Smil V (2002) The earth's biosphere. Evolution, dynamics, and change. MIT Press, Cambridge, MA.

Smil V (2008) Energy in nature and society. General energetics of complex systems. MIT Press, Cambridge, MA.

Soulé ME (1985) What is conservation biology? BioScience 11: 727–734.

Takacs D (1996) The idea of biodiversity. Philosophies of paradise. The Johns Hopkins University Press, Baltimore.

Theodossopoulos D (2003) Troubles with turtles: cultural understandings of the environment on a Greek island. Berghahn, Oxford.

Usher MB (Ed.) (1986) Wildlife conservation evaluation. Chapman and Hall, London.

Varjopuro R, Kettunen A (2008) Regional actors caught between local livelihood and international conservation: Grey seal conservation controversy. In: Joas M, Jahn D, Kern K (Eds) Governing a common sea. Environmental politics in the Baltic Sea region. Earthscan, London): 169–192.

Vuorisalo T, Lehikoinen E, Lemmetyinen R (1999) Lintusuojelun varhaisvaiheita Suomessa. In: Soikkanen T (Ed) Ympäristöhistorian näkökulmia. Piispan apajilta trooppiseen helvettiin. Poliittisen historian laitos, Turun yliopisto, Turku: 104–125. [Early stages of bird protection in Finland; in: Perspectives on environmental history; in Finnish]

Weinberg A (1972) Science and trans-science. Minerva 10: 209–222. doi: 10.1007/BF01682418

Western D, Wright RM, Strum SC (1994) Natural connections. Perspectives in community-based conservation. Island Press, Washington, DC.

Wiens J, Moss M (Eds) (2005) Issues and perspectives in landscape ecology. Cambridge University Press, Cambridge.

Wilkinson D (2006) Fundamental processes in ecology. An earth systems approach. Oxford University Press, Oxford. doi: 10.1093/acprof:oso/9780198568469.001.0001

Wilson EO, Peter FM (1988) Biodiversity. National Academy Press, Washington, DC.

Wilson EO (1997) Introduction. In: Reaka-Kudla ML, Wilson DE, Wilson EO (Eds) Biodiversity II. Understanding and Protecting Our Biological Resources, Joseph Henry Press, Washington, DC, 1–3.

Wynn G (2004) 'On Heroes, Hero-Worship, and the Heroic' in Environmental History. Environment and History 10: 133–152. doi: 10.3197/0967340041159786